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REMARKS

In the Office Action, the examiner rejected claims 1 and 3-19 under 35 U.S.C. 112, second paragraph, as being indefinite failing to particularly point out and distinctly claim the subject matter of the invention. Accordingly, the applicant has amended the set of claims to more clearly specify the features of the present invention. The language "versus" involved in obtaining the simulated pattern or observed pattern is changed to "and". The minor wording errors in the claims have been corrected.

In the Office Action, the examiner rejected claims 1 and 3-19 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. It is stated that the claims contain subject matter which was not described in the specification in such a way as required by the patent law. The applicant has amended the claims to more clearly recite the features of the present invention. The features of the present invention are disclosed in the specification and drawings of the instant application as discussed below.

It should be noted that the language "one position" in Claims 1 and 12 means a position of a particular monitor station (ex. 12a) which monitors the radiowave from the radiowave emitting source. The monitor station monitors at the "one position" a radiowave from a radiowave emitting source located at an unknown position. Thus, the "one position" is not the position of the "radiowave emitting source". The applicant regrets that the inconsistent remark was

made in the previous response to the office action regarding the "one position" and "radiowave emitting source".

Before actually monitoring the radiowaves, the method and apparatus of the present invention creates the simulated patterns of intensities and emitting directions by emitting a simulated radiowave from the "one position" of the monitor station while changing the direction of the simulated radiowave. This process is done through the computer simulation by a simulated radiowave, i.e., without using an actual radiowave. As a specific example for creating the simulated patterns, the specification discloses a ray trace method from page 16, line 20 to page 17, line 5 in the substitute specification. The simulated radiowave is a ray L_k which is, as noted above, an imaginary radiowave utilized through the computer simulation as described at page 17, lines 20-24 in the substitute specification.

As is well known in the art, the electric fields intensities of the radiowave vary by factors including distance, direction, objects (building, mountains, etc.) on the ground, etc. Thus, with use of the map (topological) data, such simulated patterns of intensities and emitting directions can be created through the computer simulation process as shown in Table 1 of page 18 and Figure 3. As a result, the simulated patterns created in advance show the intensities and directions at the "plural locations" (Claims 1 and 12).

It is important to note that since the radiowave performs the same way when the transmitting position and the receiving position are exchanged with one another, i.e., the radiowave has a reciprocity principle. As stated in the previous response to the office action, the present invention makes use of this character of radiowave as stated at page 24, lines 9-14 in the substitute specification, which reads as follows:

> In radiowave propagation, generally a radiowave propagation path is reversible between the emission side and the receiving side, and a propagation attenuation amount is also reversible, i.e., a propagation attenuation amount is the same when the emission and receipt are replaced with one another.

In other words, by changing the direction of the simulated radiowaves in an opposite direction, the pattern of intensities from various locations and directions, i.e, the "plural positions" to the "one position" of the monitor station can be obtained. Thus, when the monitor station monitors the radiowave at the "one position", the "observed pattern" should be similar to one of the simulated patterns at the "plural positions" prepared in advance. Therefore, by comparing the "observed pattern" with the "simulated patterns" and identifying the simulated pattern which shows the best correlation with the observed pattern, the location of the radiowave emitting source can be determined.

The steps recited in claim 1 are summarized in the specification from page 23, line 21 to page 24, line 19 with reference to the flow chart of Figure 6. With respect to claim 12, the radiowave observing means is directed to the monitor stations

12a-12c (from page 11, line 24 to page 13, line 8). The simulation means is directed to the simulation means 20 (page 14, lines 17-22). The simulation means 20 includes the map information storing unit 22 and the radiowave propagation simulator 24 to perform the above noted computer simulation with use of the map data (from page 16, line 20 to page 23, line 5). The radiowave emitting source identifying means is directed to the comparing unit 28 (from page 14, line 23 to page 15, line 7).

As discussed above, the recitations in the claims 1 and 12 as amended are supported by the description of the present application, and thus, the rejection under 35 U.S.C. 112, first paragraph, is no longer applicable to the present invention.

In the Office Action, the examiner rejected Claims 1 and 3-19 under 35 U.S.C. 103(a) as being obvious over the teachings by Wax et al. (U.S. Patent No. 6,249,680) and Olsson (U.S. Patent No. 5,564,079). The examiner rejected Claims 1 and 3-19 under 35 U.S.C. 103(a) as being obvious over the teachings by Sugiura et al. (U.S Patent No. 6,140,964) and Olsson (U.S. Patent No. 5,564,079). The applicant has amended the claims to more clearly define the present invention in view of the cited references.

The newly cited Olsson reference is directed to a method for determining a location of mobile station (MS) in a digital communication network. The method utilizes a combination of reference measurements using a measuring mobile and an adaptive neural network which is trained by means of the reference data.

The neural network then uses existing measurement data from mobile stations in order to locate the latter.

According to the method of the cited Olsson reference, the adaptive neural network is trained with the aid of the collected reference data in order to obtain a correlation between the measured reference data and position information. The mobile station (MS) whose location be specified transmits the measurement data indicating signals received from a plurality of base stations to the base station. The position of the MS is determined based on the stored reference data and the measurement data from the MS with use of the trained neural network.

The fundamental difference between the present invention and the method of the cited Olsson reference resides in the face that, in the cited Olsson reference, the MS whose location should be determined must receive the signals from the base stations. Although the measured data is transmitted from the MS to the base station, such measured data is made of the signals received from a plurality of base stations. In other words, the bidirectional communication between the MS and the base station is required in the cited Olsson reference. On the contrary, in the present invention, the location of the radiowave emitting source is determined by observing the radiowave from the radiowave emitting source by the monitor station. The monitor station will not transmit any radiowave to the radiowave emitting source, i.e., there is no two way communication.

The "database" recited in the cited Olsson reference is configured by signals that would be received by the MS from the base stations in combination with the position information. In the present invention, the simulated pattern is created by radiating the simulated radiowave from the location of the monitor station ("one position") and simulating the intensities of the electrical field at the "plural positions" with use of the map data. Thus, the "database" in the cited Olsson reference is fundamentally different from the "simulated patterns" in the present invention.

As discussed in the previous response to the office action, the cited Wax et al. reference is directed to a method and system for determining the position of a mobile radio transmitter such as cellular phone in a communication system. In the cited Wax et al. reference, the system tracks and locates all cellular telephone traffic from a single base station. The method uses multipath signals in order to determine a transmitter's location. More specifically, signals from a mobile transmitter are sent to an antenna array of a base station receiver in the CDMA cellular telephone network. Based upon the signals received at the antenna array, the base station determines a signal signature. The signal signature is any location-dependent feature derived from the set of direct and multipath signals received at the antenna array of the single base station from the transmitter at a given location.

After the signal signature has been determined, it is then compared with a database containing similar calibrated signal

signatures and their corresponding locations. The database of the calibrated signal signatures and corresponding locations is generated by a calibration procedure in which a calibration mobile phone roams a service area of the base station. A mobile having an unknown location can then be located by searching such a database and identifying a location whose calibrated signature best matches the measured signature. The calibrated and measured signatures are compared by calculating the similarities between the signatures of the measured signal and those of the calibrated signals.

In the method of the cited Wax et al. reference, the signature of an actual signal from the mobile radio transmitter and its position information are collected in advance in the database at the base station as calibration signatures. The location of the mobile radio transmitter is determined by comparing the signatures detected by the array of antennas with the calibrated signatures in the data base. In other words, the actual signals have to be used both in creating the database and in comparing the signatures.

In the present invention, however, the monitor station at the "one position" monitors a radiowave from a radiowave emitting source and compares the observed pattern with the simulated pattern. As noted above, the simulated patterns are created by emitting a simulated radiowave from the position of the monitor station ("one position") while changing the direction of the simulated radiowave. In other words, the simulated patterns are created through the computer simulation without using any actual

radiowave. Therefore, the basic principle of operation and structure of the present invention is fundamentally different from that disclosed by the cited Wax et al. reference.

As discussed in the previous response to the office action, the cited Sugiura et al. reference is directed to a radio mobile station position detection method for finding the position of a mobile station. In the position detection method, the mobile station measures the reception radio wave strength levels from a plurality of base stations at a measuring point to convey the measurement results through a base station to a control station. The control station uses a neural network to learn a correlation between the reception radio strength levels and the position of the mobile station on the basis of the measurement results at a plurality of measuring points and the positional data at the measuring points. In the cited Sugiura reference, when the mobile station sends the measurement results of the reception radio strengths from the plurality of base stations measured at the plurality of measuring points, the control station estimates the position of the mobile station bearing the measurement results based on the correlation between the reception radio strength levels and the positions of the mobile station obtained through the learning. Therefore, the technologies disclosed by the cited Sugiura reference are basically the same as that disclosed by the cited Olsson reference.

As noted above, in the method of the cited Sugiura et al. reference, the mobile station measures the reception radio wave strength levels from the plurality of base stations at the measuring point. The mobile station then sends the measured results to the control station where the position of the mobile station is estimated by comparing the reception signal with the data obtained through the learning. In other words, the bidirectional communication between the mobile station and the base station is required in the cited Olsson reference.

The present invention, however, does not involve a plurality of base stations or a control station. Based on the principle of reciprocity, the monitor station at the "one position" monitors a radiowave from a radiowave emitting source and compares the observed pattern with the simulated pattern. As noted above, the simulated pattern is created by radiating the simulated radiowave from the location of the monitor station ("one position") and simulating the intensities of the electrical field at the "plural positions" through the computer simulation. There is no bidirectional or two way communication between the monitor station and the radiowave emitting source. Therefore, the basic principle of operation and structure of the present invention is fundamentally different from that disclosed by the cited Sugiura et al. reference.

As discussed above, the present invention defined in the claims as amended is fully distinguishable from the technologies

disclosed by the cited references. Therefore, the rejection under 35 U.S.C. 103(a) is no longer applicable to the present invention.

In view of the foregoing, the applicant believes that Claims 1, 3-19 are in condition for allowance, and accordingly, the applicant respectfully requests that the present application be allowed and passed to issue.

Respectfully submitted,

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